Docket No.: SMQ-082CN1/P6396CNT
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
John Teloh *et al.*

Application No.: 09/988853 Group Art Unit: 2164

Filed: November 19, 2001 Examiner: J. F. Betit

For: STORAGE NETWORK DATA REPLICATOR

## TRANSMITTAL LETTER OF APPEAL BRIEF

MS Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed July 26, 2005, the response due date of which is extended to September 26, 2005, by the accompanying Request for Extension of Time, Applicants submit the enclosed Appeal Brief in compliance with 37 C.F.R. §41.37(c)(1)(v).

The courtesy of Examiner Betit in granting the interview of September 8, 2005, and the helpful comments proffered at that time are acknowledged with appreciation. Applicants have amended Section 5 of the Appeal Brief filed May 20, 2005, to clarify how the claimed subject matter in the above-referenced U.S. Patent Application relates to methods of replicating data in a storage area network. The amendments to Section 5 of the enclosed Appeal Brief do not introduce any new matter and does not raise any new issues. Accordingly, Applicants hereby contend Section 5 of the enclosed Appeal Brief contains a concise explanation of the invention defined in the claims involved in the Appeal to allow one skilled in the art and the members of The Board of Patent Appeals and Interferences to determine where the claimed subject matter is discussed in the above-referenced application.

If other non-conformities remain, we request the courtesy of a telephone call to the

undersigned before issuance of a Notification of Non-Compliant Appeal Brief.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 12-0080, under Order No. SMQ-082CN1. A duplicate copy of this paper is enclosed.

Dated: September 26, 2005

Respectfully submitted,

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Docket No.: SMQ-082CN1/P6396CNT
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John Teloh *et al.*

Application No.: 09/988853 Confirmation No.: 9384

Filed: November 19, 2001 Art Unit: 2164

For: STORAGE NETWORK DATA REPLICATOR Examiner: J. F. Betit

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Date of Deposit September 26, 2005

I hereby certify that this transmittal letter and the papers referred to as being enclosed therein are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the MS Appeal Brief – Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450.

Signature
David R. Burns
Please Print Name of Person Signing

**APPEAL BRIEF**

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notification of Non-Complaint Appeal Brief mailed on July 26, 2005, Appellant resubmits herewith a complete new brief in compliance with 37 C.F.R. §41.37.

The fees required under § 41.20(b)(2), and any required petition for extension of time for filing this brief and fees, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

I. Real Party In Interest
II Related Appeals and Interferences

## I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Sun Microsystems, Inc.

## II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF CLAIMS

### A. Total Number of Claims in Application

There are 51 claims pending in application.

### B. Current Status of Claims

1. Claims pending: 1-51

2. Claims rejected: 1-51

### C. Claims On Appeal

The claims on appeal are claims 1-51

## IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment after Final Rejection.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention provides a solution to overcome the shortcomings of conventional data transmission connections. Such conventional connections include enterprise system connections and fiber arbitrated loops that are not able to provide the necessary long distance separation between an operational work center and the data repository to overcome regional disasters without the use of high cost of dedicated transmission mediums, such as a high-speed fiber optic cable. The claimed invention also provides a solution for compatibility issues among remote storage devices and a solution to latency issues often experienced while performing long distance data mirroring. In general, the claimed invention relates to providing a method and system enabling remote data mirroring amongst multiple remote storage devices across data transmissions paths having various transmission capabilities and remote mirroring sites operating on various operating platforms.

In one aspect of the claimed invention, the claimed invention allows data replication from a first location to multiple remote locations. At the first location, a selected data structure is replicated and forward to a first remote location for replication and further forwarded to a second remote location. The first remote location replicates the received replicated data and forwards the replication of the received data to the second remote location. Transmission between the originating location and each of the remote locations occurs in a stateless manner using the TCP/IP protocol suite. The transmission rate between the originating location and the first remote location can differ from the transmission rate between the first remote location and the second remote location. Furthermore, the operating platform of the originating location can differ from the operating platform of the first remote location, which can differ from the operating platform of the second remote location.

In another aspect of the claimed invention, the claimed invention allows for updating of one or more data structures of a remote storage device using a single data set. The one or more data structures are identified and selected from a local storage device. The data structures selected are more current than their corresponding data structure counterparts on a remote storage device. The selected data structures are grouped together as a single entity, while preserving the write ordering within each structure. The single data entity is then mirrored to the

remote storage device to update the one or more corresponding data structures counterparts at the remote storage device.

In still another aspect of the claimed invention, the claimed invention provides a first networked computer to log all local disk updates during a period of time when the remote mirroring of data cannot be accomplished. The first networked computer determines when remote mirroring of data can be re-established and groups all of its disk updates into a single data set. The first networked computer restarts the remote mirroring of data to one or more remote network computers when remote mirroring of data is re-established.

As defined by independent claim 1, Appellant's invention relates to a method for replicating data in a storage network. Performance of the method logically groups two or more structures held by a storage device 24 locally accessible to a first programmable electronic device 12 (page 6, lines 25-26) into a single data set (page 6, lines 29-30) to form a group (step 94 in FIG. 5). Performance of the method replicates the group (page 14, lines 28-30 and step 96 in FIG. 5), and forwards the replica of the group from a first data replication facility 20 at a first programmable electronic device 12 to a second data replication facility 20' at a second programmable electronic device 14 for storage by a second storage device 26 (step 96 in FIG. 5). The replica of the group is forwarded using a communication protocol 28 (page 9, lines 30-31).

Dependent claim 2 depends from independent claim 1 and further includes the step of forwarding from the first replication facility to the second replication facility information identifying a storage location at the second storage device at which to store the copy of the single data set (page 12, lines 3-4, and page 13, lines 14-16).

Dependent claim 3 depends from independent claim 1 and further includes the limitation of using a synchronous manner to forward the replica of the group from the first programmable electronic device to the second programmable electronic device (page 10, lines 5-6).

Dependent claim 4 depends from independent claim 1 and further includes the limitation of using an asynchronous manner to forward the replica of the group from the first programmable electronic device to the second programmable electronic device (page 10, lines 5-6).

Dependent claim 5 depends from independent claim 1 and further includes the limitation that the communication protocol includes the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (page 10, lines 24-26).

Dependent claim 6 depends from independent claim 1 and further includes the limitation that the first programmable electronic device and the second programmable electronic device operate without a volume manager facility (page 8, lines 27-28).

Dependent claim 7 depends from independent claim 1 and further includes the limitation that each of the two structures includes a logical volume (page 4, lines 26-28).

As defined by independent claim 8, Appellant's invention relates to a method for replicating data in a storage network to update one or more data structures of a remote storage device. Performance of the method instructs a first data replication facility 20 of a first electronic device 12 to logically associate a first and second data structure held by a locally accessible storage device 24 to define a group (step 94 in FIG. 5). Performance of the method generates a replica of the first and second data structure as the group and outputs the replica using a data communication protocol (page 9, lines 30-31) from the first replication facility 20 of the first electronic device 12 to a second replication facility 20' of a second electronic device 14 to update one or more data structures of a remote storage device 26 (step 96 of FIG. 5).

Dependent claim 9 depends from independent claim 8 and further includes the step of packaging with the replica information identifying one or more storage locations for storage of the replica on the remote storage device (page 12, lines 3-4, and page 13, lines 14-16).

Dependent claim 10 depends from independent claim 8 and further includes the element of instructing the first data replication facility to preserve a write ordering of the two data structures in the single data set (page 6, lines 29-30, page 14, lines 19-30 and step 94 in FIG. 5).

Dependent claim 11 depends from independent claim 8 and further includes the limitation that the communication protocol includes the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (page 10, lines 24-26).

Dependent claim 12 depends from independent claim 8 and further includes the limitation that the first electronic device and the second electronic device perform replication of data without a volume manager (page 8, lines 27-28).

As defined by independent claim 13, Appellant's invention relates to a readable medium holding programmable electronic device readable instructions for executing a method for replicating data in a storage network. The method includes the step of identifying to a first data replication facility 20 at a first programmable electronic device 12 two structures held by a storage device 24 locally accessible to the first programmable electronic device 12. The method further includes the step of instructing the first data replication facility 20 to group the two structures (step 94 in FIG. 5; page 6, lines 29-30; page 10, lines 6-9). The method also includes the step of generating a replica of the first and second data structure as a group at the first data replication facility (page 14, lines 28-30 and step 96, FIG. 5). The method includes the step of asserting the replica in accordance with a communication protocol (page 9, lines 30-31) from the first data replication facility 20 to a second data replication facility 20' at a second programmable electronic device 14 for storage by a second storage device 26 locally accessible to the second programmable electronic device 14 (step 96, FIG. 5).

Dependent claim 14 depends from independent claim 13 and further includes the step of forwarding from the first replication facility to the second replication facility information identifying a storage location for the second storage device to store the replica (page 13, lines 14-16).

Dependent claim 15 depends from independent claim 13 and further includes the limitation of using a synchronous manner to forward the replica from the first programmable electronic device to the second programmable electronic device (page 10, lines 5-6 and FIG. 2).

Dependent claim 16 depends from independent claim 13 and further includes the limitation of using an asynchronous manner to forward the replica from the first programmable electronic device to the second programmable electronic device (page 10, lines 5-6 and FIG. 3).

Dependent claim 17 depends from independent claim 13 and further includes the limitation that the communication protocol includes the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (page 10, lines 24-26).

Dependent claim 18 depends from independent claim 13 and further includes the limitation that the first and second programmable electronic devices operate without a volume manager facility (page 8, lines 27-28).

Dependent claim 19 depends from independent claim 13 and further includes the limitation that each of the two structures includes a group of records (page 8, lines 17-20 and page 14, lines 27-29).

Dependent claim 20 depends from independent claim 13 and further includes the limitation that each of the two structures includes a logical volume (page 4, lines 26-28).

As defined by independent claim 21, Appellant's invention is related to a method performed in a storage network to create a replica of selected data in the storage network. Performance of the method instructs a first data replication facility 20 at a first electronic device 12 is instructed to track changes to one or more storage locations of a first storage medium 24 that correspond to selected data (step 112 in FIG. 8). Performance of the method instructs the first data replication facility 20 to generate a replica of the selected data based on the tracked changes to the one or more location of the first storage medium (page 15, line 32 to page 16, line 1 and step 114 in FIG. 8) and place the replica in a data structure (step 112 in FIG. 8). Performance of the method forwards the replica to a second data replication facility 20' at a second electronic device 14 in the storage network (step 114 in FIG. 8) using a communication protocol (page 4, lines 8-11). The replica of the selected data is then stored on a second storage medium by the second electronic device 14 (step 116 in FIG. 8).

Dependent claim 22 depends from independent claim 21 and further includes the step of sending an instruction from the first data replication facility to the second data replication facility to initiate a process for receiving and storing the replica (step 114 in FIG. 8).

Dependent claim 23 depends from independent claim 21 and further includes the step of halting the generation of the replica held by the data structure is forwarded from the data structure to the second data replication facility (step 116 in FIG. 8).

Dependent claim 24 depends from independent claim 21 and further includes the step of packaging the copy of the selected data information that identifies a storage location for storing the copy of the selected data on the second storage medium (step 116 in FIG. 8).

Dependent claim 25 depends from independent claim 21 and further includes the step of identifying to the first data replication facility the selected data held by the first storage medium in communication with the first electronic device (step 110 in FIG. 8).

Dependent claim 26 depends from independent claim 21 and further includes the limitation that the data structure includes a queue (step 112 in FIG. 8).

Dependent claim 27 depends from independent claim 21 and further includes the limitation that the first electronic device forwards the replica of the selected data from the data structure to the second data replication facility in a first in first out manner (step 70 in FIG. 3).

Dependent claims 28 depends from dependent claim 27 and further includes the limitation that the first electronic device forwards the replica of the selected data from the data structure to the second data replication facility in a synchronous manner (page 10, lines 5-6).

Dependent claims 29 depends from dependent claim 27 and further includes the limitation that the first electronic device forwards the replica of the selected data from the data structure to the second data replication facility in an asynchronous manner (page 10, lines 5-6).

Dependent claim 30 depends from independent claim 21 and further includes the limitation that the communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (page 10, lines 24-26).

Dependent claim 31 depends from independent claim 21 and further includes the limitation that the first and second electronic devices operate without a volume manager facility (page 8, lines 27-28).

Dependent claim 32 depends from independent claim 21 and further includes the limitation that the one or more locations of the first storage medium includes a track, a sector, a logical volume, or a logical offset into the first storage medium (page 8, lines 18-20 and page 14, lines 2-4).

As defined by independent claim 33, Appellant's invention is related to a readable medium holding programmable electronic device readable instructions for executing a method to create a replica of selected data in a storage network. The method includes the step of instructing a first data replication facility 20 at a first programmable electronic device 12 in the network to track changes to one or more areas of a first storage device 24 in communication with the first programmable electronic device 12 (step 112 in FIG. 8). The one or more areas correspond to the selected data. The method further includes the step of instructing the first data replication facility to generate the copy of the selected data based on the tracked changes to the one or more areas of the first storage device (step 114 in FIG. 8). The method also includes the step of placing the copy of the selected data in a data structure (step 112 in FIG. 8). The method further includes the step of forwarding the copy of the selected data (step 114 in FIG.8) in accordance with a communication protocol (page 11, lines 10-14) from the data structure to a second data replication facility 20' at a second programmable electronic device 14 in the storage network for storage of the copy of the selected data on a second storage device 26 in communication with the second programmable electronic device 14 (step 116 in FIG. 8).

Dependent claim 34 depends on independent claim 33 and further includes the element of sending an instruction from the first data replication facility at the first programmable electronic device to the second data replication facility at the second programmable electronic device to initiate a process for receiving and storing the copy of the selected data (step 114 in FIG. 8).

Dependent claim 35 depends on independent claim 33 and further includes the element of halting the generation of the copy of the selected data until the copy held by the data structure is forwarded from the data structure to the second data replication facility at the second electronic device in the storage network (step 116 in FIG. 8).

Dependent claim 36 depends on independent claim 33 and further includes the element of packaging with the copy of the selected data information that identifies a storage location for the copy of the selected data in the second storage device (step 116 in FIG. 8).

Dependent claim 37 depends on independent claim 33 and further includes the element of identifying to the first data replication facility the selected data held by the first storage device (step 110 in FIG. 8).

Dependent claim 38 depends on independent claim 33 and further includes the limitation that the data structure includes a queue (step 112 in FIG. 8).

Dependent claim 39 depends on independent claim 33 and further includes the limitation that the first programmable electronic device forwards the copy of the selected data from the data structure to the second data replication facility at the second programmable electronic device in a first in first out manner (step 70 in FIG. 3).

Dependent claim 40 depends on dependent claim 39 and further includes the limitation that the first programmable electronic device forwards the copy of the selected data from the data structure to the second data replication facility of the second programmable electronic device in a synchronous manner (page 10, lines 5-6).

Dependent claim 41 depends on dependent claim 39 and further includes the limitation that the first programmable electronic device forwards the copy of the selected data from the data structure to the second data replication facility of the second programmable electronic device in an asynchronous manner (page 10, lines 5-6).

Dependent claim 42 depends on independent claim 33 and further includes the limitation that the communication protocol includes the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite (page 10, lines 24-26).

Dependent claim 43 depends on independent claim 33 and further includes the limitation that the first programmable electronic device and the second programmable electronic device operate without a volume manager facility (page 8, lines 27-28).

Dependent claim 44 depends on independent claim 33 and further includes the limitation that the one or more areas of the first storage device comprise a track, a sector, a logical volume, or a logical offset into the first storage medium (page 8, lines 18-20 and page 14, lines 2-4).

As defined by independent claim 45, Appellant's invention is related to a method for replicating data in a distributed network to update a remote storage device with data from a local storage device. The method includes the step of instructing a first data replication facility 20 at a first electronic device 12 in the distributed network to track one or more locations of a local storage device 24 that correspond to one or more identified volumes (step 112 in FIG. 8). The first data replication facility 20 groups each of the one or more identified volumes into a single data set (step 112 in FIG. 8). A copy of the single data set is generated at the first data replication facility 20 (step 114 in FIG. 8). The method further includes the step of asserting the copy of the single data set in accordance with a communication protocol (page 4, lines 8-11) towards a second replication facility 20' of a second electronic device 14 in the distributed network to update the remote storage device (step 116 in FIG. 8).

Dependent claim 46 depends on independent claim 45 and further includes the step of sending a command from the first data replication facility to the second data replication facility to initiate receipt of the copy of the single data set (step 114 in FIG. 8).

Dependent claim 47 depends on independent claim 45 and further includes the step of packaging with the copy of the single data set information that indicates a storage location for each volume in the replica for storage on the remote storage device (step 116 in FIG. 8).

Dependent claim 48 depends on independent claim 45 and further includes the step of sending from the second data replication facility to the first data replication facility an indication that the update to the remote storage device is completed (step 116 in FIG. 8).

Dependent claim 49 depends on independent claim 45 and further includes the step of writing the copy of the single data set to a local queue for temporary storage before asserting the copy of the single data set in accordance with the communication protocol toward the second replication facility (step 112 in FIG. 8).

Dependent claim 50 depends on independent claim 45 and further includes the step of identifying to the first data replication facility the one or more volumes of the data for the copying of data to update the remote storage device (step 110 in FIG. 8).

Dependent claim 51 depends on dependent claim 47 and further includes the limitation that the information comprises one of a volume name and a volume number (page 8, lines 27-28).

## VI. ISSUES TO BE REVIEWED ON APPEAL

Claims 1-4, 6-10, 12-16, 18, 20-23, 25-29, 31-35, 37-41, 43-46, and 48-50 are rejected under U.S.C. §102(e) as being anticipated by United States Patent No. 6,629,264 to Sicola et al. ("Sicola").

Claims 5, 11, 17, 19, 30, and 42 are rejected under U.S.C. §103(a) as being unpatentable over Sicola in view of United States Patent No. 6,324,654 B1 to Wahl et al.("Wahl").

Claims 24, 36, 47, and 51 are rejected under U.S.C. §103(a) as being unpatentable over Sicola in view of United States Patent No. 6,209,002 B1 to Gagne et al.("Gagne").

## VII. ARGUMENT

### A. Rejection of claims 1-4, 6-10, 12-16, 18, 20-23, 25-29, 31-35, 37-41, 43-46, and 48-50 under U.S.C. §102(e)

Claims 1-4, 6-10, 12-16, 18, 20-23, 25-29, 31-35, 37-41, 43-46, and 48-50 are rejected as anticipated by Sicola. Appellant respectfully submits that the Examiner has failed to establish a prima facie case of anticipation.

To establish a prima facie case of anticipation, each and every element and limitation of the present invention must be disclosed expressly or inherently in a single prior art reference. *RCA Corp. v. Applied Digital Data Sys., Inc.*, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). Independent claims 1, 8, 13, 21, 33, and 45 all require the element of logically grouping two elements held by a storage device (regardless of the elements being structures, data

structures, selected data, or one or more volumes) into a group, wherein said group is a single data set (see step 66 in Fig. 3 or step 94 in Fig. 5). Sicola fails to disclose this step of grouping two elements held by a storage device into a group.

Sicola discusses a data replication system having a redundant configuration including dual Fiber Channel fabric links interconnecting each of the components of two data storage sites. Each of the data storage site comprises a host computer and associated data storage array, with redundant array controllers and adapters. Each array controller is capable of performing all of the data replication functions and each host sees remote data as if it were local. The array controllers perform a command and data logging function which stores all host write commands and data missed by the backup storage array during a situation wherein the links between the sties are down, the remote site is down, or where a site failover to the remote site has occurred (see col. 3 lines 2 -18).

Sicola discusses pairing of volumes on a local array with those on a remote array, and the combination of volumes is called a remote copy set (see col. 6 lines 45-49). However, a remote copy set contains data that are physically in two arrays, a local array and a remote array, that reside on two different storage device. An example of this is shown in LUN 110 and LUN 110' in Fig. 1 (see col. 6, lines 49-52). The Examiner suggested in the first Office Action mailed on December 31, 2003, that Sicola teaches the limitation of instructing the first data replication facility to logically group the first structure and the second structure from the storage device to create a group at col. 20, lines 38-55.

In the Response to first Office Action, Appellant argued that Sicola does not perform the steps of logically grouping a first and second data structure held by a local storage device as a group and that the pairing of a local volume and a remote volume is referred to throughout Sicola as a "remote copy set." A remote copy set is defined by Sicola as consisting of two same sized volumes, one on the local array, and one on the remote array (See col. 8, lines 51-57). Appellant further argued in the Response to the first Office Action that Sicola defines an association set as a group of logical units (i.e. a set of one or more remote copy sets) on a local or remote pair of array controllers with attributes for logging and failover selectable by a system user (See col. 19, lines 58-61 of Sicola).

In the Final Office Action mailed on June 29, 2004, the Examiner maintained his rejection of independent claims 1, 8, 13, 21, 33, and 45 under 35 U.S.C. §102(e). The Examiner's response to Appellant's arguments as stated above in response to the first Office Action was that the arguments have been considered, but they are not deemed persuasive because at column 20, lines 38-55, Sicola teaches establishing an association set, "S", made of n logical units on the same system. The Examiner further argued that Sicola states that each member of an association set must also be a member of a remote copy set (See col. 20, lines 45-47) and that Sicola teaches that these remote copy sets are used to keep a constant replica of each other which causes the local array to send any writes to a local volume over to its replicated remote volume (See col. 8, line 52, through col. 9, line 7).

In the Response to the Final Office Action, Appellant argued that Sicola does not disclose the step of grouping as suggested by the Examiner in col. 20, lines 38-55. Instead, the cited section discusses the implementation of "association sets." Appellant pointed out in this Response again that Sicola defines an association set as a group of logical units (a set of one more remote copy sets) on a local or remote pair of array controllers at col. 19, lines 58-60 and that the term "remote copy set" is defined as comprising a pair of same-sized volumes, one on the local array, and one on the remote array in col. 8, lines 55-57. An example was given as can be seen in logical units 410 and 410' in Figure 4 in Sicola. Appellant explained that therefore, an associate set consists of pairs of volumes on different sites (initiator site and target site), whereas in the claimed invention, the grouping of structures consists of structures on the same site.

In both Office Actions, the Examiner suggested that "group" is read on "set". Appellant respectfully submit that "group" and "set" cannot be taken as equivalent. As the Examiner pointed out in col. 20, lines 45-47 of Sicola, Sicola requires that each logical unit that is a member of an association set must also be a member of a remote copy set. The definition of a remote copy set (See col. 8, lines 55-57) further clarify that the idea of grouping in Sicola means grouping of volumes on more than one storage site. This is very different from what independent claims 1, 8, 13, 21, 33, and 45 require. These independent claims require the grouping of two elements within one storage device. Therefore, Appellant respectfully submits

that Sicola does not anticipate independent claims 1, 8, 13, 21, 33 and 45 and their dependent claims, 2-7, 9-12, 14-20, 22-32, 34-44, and 46-51.

Accordingly, Appellant respectfully requests that the Board to reverse the Examiner's final rejection of claims 1-4, 6-10, 12-16, 18, 20-23, 25-29, 31-35, 37-41, 43-46, and 48-50 under U.S.C. §102(e).

B. Rejection of claims 5, 11, 17, 19, 30, and 42 under U.S.C. §103(a)

Claims 5, 11, 17, 19, 30, and 42 are rejected under 35 U.S.C. §103(a) as obvious over Sicola in view of Wahl. Appellant respectfully submits that the rejection of these claims was improper.

To establish a prima facie case of obviousness with respect to a claim, it is necessary that the prior art references, either alone or in combination, teach or suggest each and every limitation of the rejected claims. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Claims 5, 11, 17, 19, 30, and 42 depend from one of the independent claims 1, 8, 13, 21, 33, and 45 and include all the limitations of their corresponding independent claims. As set forth above, Sicola does not disclose the element of logically grouping two elements held by a storage device into a group as required by independent claims 1, 8, 13, 21, 33, and 45. Furthermore, Sicola does not teach or suggest this limitation because Sicola discusses the pairing of volumes on two different storage sites and not on the same storage site. Additionally, the paired volumes in Sicola are identical (one is a remote copy of another), thus it is not logical to want to group two identical volumes and transfer the two identical volumes from one electronic device to another electronic device for storage.

In the first Office Action, claims 5, 11, 17, 19, 30, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sicola in view of Wahl. In response to the first Office Action, Appellant argued that Wahl patent was not cited for teaching or suggesting the idea of logical grouping two data structures from a storage device. Appellant further argued that claims 5, 11, 17, 19, 30, and 42 are patentable for the same reasons as their independent claims 1, 8, 13, 21, and 33.

The Examiner maintained his rejection in the final Office Action. Appellant argued in the response to the final Office Action that since both Sicola and Wahl does not disclose the limitation of grouping data volumes in one storage device or the limitation of making a replica of selected data based on the tracked changes, Appellant requested the Examiner to reconsider and withdraw the rejections of claims 5, 11, 17, 19, 30, and 42.

Wahl fails to teach or suggest this element of logically grouping two elements held by a storage device into a group. Wahl discusses a logical group comprising of a master mirror daemon on a local system, a remote mirror daemon on a remote system and several data storage units on both the local system and the remote system as shown in Fig. 5. In other words, Wahl discusses a logical group that spans two systems and several storage devices. Wahl therefore does not teach or suggest grouping of two elements held by one storage device into a group.

Accordingly, Appellant respectfully requests that the Board reverse the Examiner's final rejection of claims 5, 11, 17, 19, 30, and 42 under 35 U.S.C. §103(a).

C. Rejection of claims 24, 36, 47 and 51 under 35 U.S.C. §103(a)

Claims 24, 36, 47, and 51 are rejected as obvious over Sicola in view of Gagne. Appellant respectfully request reversal of this rejection.

Claims 24, 36, 47, and 51 depend from independent claims 21, 33, 45 and 45, respectively, and include all the limitations of their corresponding independent claims. As set forth above, Sicola does not disclose the element of logically grouping two elements held by a storage device into a group as required by independent claims 1, 8, 13, 21, 33, and 45. Furthermore, Sicola does not teach or suggest this limitation because Sicola discusses the pairing of volumes on two different storage sites and not on the same storage site. Additionally, the paired volumes in Sicola are identical (one is a remote copy of another), thus it is not logical to want to group two identical volumes and transfer the two identical volumes from one electronic device to another electronic device for storage.

In the first Office Action, claims 24, 36, 47, and 51 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sicola in view of Gagne. In response to the first Office

Action, Appellant argued that claims 24, 36, 47, and 51 are patentable for the same reasons as their independent claims 21, 33, and 45. Appellant further argued that Sicola does not disclose each and every limitation of independent claims 21, 33, and 45 and the Gagne patent does not bridge the factual deficiencies of the Sicola patent. Therefore, Appellant concluded that the allowance of claims 24, 36, 47, and 51 are in order.

In the final Office Action, the Examiner maintained his rejection. In response to the final Office Action, Appellant argued that Gagne was cited by the Examiner as teaching a data storage facility that mirrors data onto at least three different remote sites. Appellant further argued that Gagne does not teach or suggest the missing limitations in the independent claims 21, 33, and 45 upon which claims 26, 36, 47, and 51 are dependent. Appellant concluded that since the combination of references fails to teach or suggest all of the claimed elements of claims 24, 26, 47, and 51, Appellant requested the rejections be withdrawn.

Gagne fails to teach or suggest this element of logically grouping two elements held by a storage device into a group. Gagne discusses a method and apparatus for providing redundant data storage at remote storage facilities in an economical way. Gagne also discusses transferring data from one site to another on a track-by-track basis. However, nowhere does Gagne discuss how to logically group two elements held by a storage device into a group. Therefore, Gagne does not teach or suggest grouping of two elements held by one storage device into a group.

Accordingly, Appellant respectfully submits that Sicola in combination with Gagne does not teach or suggest each and every limitation of independent claims 21, 33, and 45, on which claims 24, 36, 47, and 51 depend. Therefore, Appellant respectfully submits that Sicola and Gagne fail to teach or suggest each and every element of claims 24, 36, 47, and 51. Accordingly, Appellant respectfully requests that the Board to reverse the Examiner's final rejection of claims 24, 36, 47, and 51.

## VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

IX. EVIDENCE

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

X. RELATED PROCEEDINGS

No related proceedings are referenced in II. above, or copies of decisions in related proceedings are not provided, hence no Appendix is included.

Applicant believes no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. SMQ-082CN1 from which the undersigned is authorized to draw.

Dated: September 26, 2005

Respectfully submitted,

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No.** 09/988853

1. In a storage network, a method for replicating data in said storage network, said method comprising the steps of:

identifying to a first data replication facility at a first programmable electronic device in said storage network a first structure and a second structure held by a storage device locally accessible to said first programmable electronic device;

instructing said first data replication facility to logically group said first structure and said second structure from said storage device to create a group;

generating a replica of said group at said first data replication facility; and

forwarding said replica in accordance with a communication protocol from said first data replication facility at said first programmable electronic device to a second data replication facility at a second programmable electronic device in said storage network for storage by a second storage device.

2. The method of claim 1, further comprising the step of, forwarding from said first data replication facility at said first programmable electronic device to said second data replication facility at said second programmable electronic device information identifying a storage location at said second storage device at which to store said replica.

3. The method of claim 1, wherein said first programmable electronic device forwards said replica to said second programmable electronic device in a synchronous manner.

4. The method of claim 1, wherein said first programmable electronic device forwards said replica to said second programmable electronic device in an asynchronous manner.

5. The method of claim 1, wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

6. The method of claim 1, wherein said first programmable electronic device and said second programmable electronic device in said storage network operate without a volume manager facility.

7. The method of claim 1, wherein said first structure comprises a first logical volume and said second structure comprises a second logical volume.

8. A method for replicating data in a storage network to update one or more data structures of a remote storage device, said method comprising the steps of:

instructing a first data replication facility of a first electronic device in said storage network to logically associate a first data structure and a second data structure held by a locally accessible storage device, wherein said logical association defines a group;

generating a replica of said first data structure and said second data structure as said group; and

outputting said replica in accordance with a data communications protocol from said first replication facility of said first electronic device to a second replication facility of a second electronic device in said storage network to update said one or more data structures of said remote storage device.

9. The method of claim 8, further comprising the steps of, packaging with said replica, information identifying one or more storage locations for storage of said replica on said remote storage device.

10. The method of claim 8, further comprising the steps of, instructing said first data replication facility to preserve a write ordering of said first data structure and said second data structure in said group.

11. The method of claim 8, wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

12. The method of claim 8, wherein said first electronic device and said second electronic device in said storage network perform said replicating of data without a volume manager.

13. A readable medium holding programmable electronic device readable instructions for executing a method for replicating data in a storage network, said method comprising the steps of:

identifying to a first data replication facility at a first programmable electronic device in said storage network a first structure and a second structure held by a storage device locally accessible to said first programmable electronic device;

instructing said first data replication facility to group said first structure and said second structure from said storage device;

generating a replica of said first structure and said second structure as a group at said first data replication facility; and

asserting said replica in accordance with a communication protocol from said first data replication facility at said first programmable electronic device to a second data replication facility at a second programmable electronic device in said storage network for storage by a second storage device locally accessible to said second programmable electronic device.

14. The readable medium of claim 13, further comprising the step of, forwarding from said first data replication facility at said first programmable electronic device to said second data

replication facility at said second programmable electronic device information identifying a storage location for said second storage device to store said replica.

15. The readable medium of claim 13, wherein said first programmable electronic device forwards said replica to said second programmable electronic device in a synchronous manner.

16. The readable medium of claim 13, wherein said first programmable electronic device forwards said replica to said second programmable electronic device in an asynchronous manner.

17. The readable medium of claim 13, wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

18. The readable medium of claim 13, wherein said first programmable electronic device and said second programmable electronic device in said storage network operate without a volume manager facility.

19. The readable medium of claim 13, wherein said first structure comprises a first group of records and said second structure comprises a second group of records.

20. The readable medium of claim 13, wherein said first structure comprises a first logical volume and said second structure comprises a second logical volume.

21. In a storage network, a method to create a replica of selected data in said storage network, said method comprising the steps of:

instructing a first data replication facility at a first electronic device in said storage network to track changes to one or more storage locations of a first storage medium that correspond to said selected data;

instructing said first data replication facility to generate said replica of said selected data based on said tracked changes to said one or more locations of said first storage medium;

placing said replica of said selected data in a data structure; and

forwarding said replica of said selected data in accordance with a communication protocol from said data structure to a second data replication facility at a second electronic device in said storage network for storage of said replica on a second storage medium by said second electronic device.

22. The method of claim 21, further comprising the step of, sending an instruction from said first data replication facility at said first electronic device to said second data replication facility at said second electronic device to initiate a process for receiving and storing said replica of said selected data.

23. The method of claim 21, further comprising the step of, halting said generation of said replica of said selected data until said replica held by said data structure is forwarded from said data structure to the second data replication facility at the second electronic device in said storage network.

24. The method of claim 21, further comprising the step of, packaging with said replica of said selected data information that identifies a storage location for storage of said replica of said selected data on said second storage medium.

25. The method of claim 21, further comprising the step of, identifying to said first data replication facility at said first electronic device in said storage network said selected data held by said first storage medium in communication with said first electronic device.

26. The method of claim 21, wherein said data structure comprises a queue.

27. The method of claim 21, wherein said first electronic device performs said forwarding of said replica of said selected data from said data structure to said second data replication facility at said second electronic device in a first in first out (FIFO) manner.

28. The method of claim 27, wherein said first electronic device performs said forwarding of said replica of said selected data from said data structure to said second data replication facility at said second electronic device in a synchronous manner.

29. The method of claim 27, wherein said first electronic device performs said forwarding of said replica of said related data from said data structure to said second data replication facility of said second electronic device in an asynchronous manner.

30. The method of claim 21, wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

31. The method of claim 21, wherein said first electronic device and said second electronic device operate without a volume manager facility.

32. The method of claim 21, wherein said one or more locations of said first storage medium comprise one of a track, a sector, a logical volume and a logical offset into said first storage medium.

33. A readable medium holding programmable electronic device readable instructions for executing a method to create a replica of selected data in a storage network, said method comprising the steps of:

instructing a first data replication facility at a first programmable electronic device in said network to track changes to one or more areas of a first storage device in

communication with said first programmable electronic device, wherein the one or more areas correspond to said selected data;

instructing said first data replication facility to generate said replica of said selected data based on said tracked changes to said one or more areas of said first storage device;

placing said replica of said selected data in a data structure; and

forwarding said replica of said selected data in accordance with a communication protocol from said data structure to a second data replication facility at a second programmable electronic device in said storage network for storage of said replica on a second storage device in communication with said second programmable electronic device.

34. The readable medium of claim 33, further comprising the step of, sending an instruction from said first data replication facility at said first programmable electronic device to said second data replication facility at said second programmable electronic device to initiate a process for receiving and storing said replica of said selected data.

35. The readable medium of claim 33, further comprising the step of, halting said generation of said replica of said selected data until said replica held by said data structure is forwarded from said data structure to the second data replication facility at the second electronic device in said storage network.

36. The readable medium of claim 33, further comprising the step of, packaging with said replica of said selected data information that identifies a storage location for said replica of said selected data in said second storage device in communication with said second programmable electronic device.

37. The readable medium of claim 33, further comprising the step of, identifying to said first data replication facility at said first programmable electronic device in said storage network said selected data held by said first storage device in communication with said first computer.

38. The readable medium of claim 33, wherein said data structure comprises a queue.

39. The readable medium of claim 33, wherein said first programmable electronic device forwards said replica of said selected data from said data structure to said second data replication facility at said second programmable electronic device in a first in first out (FIFO) manner.

40. The readable medium of claim 39, wherein said first programmable electronic device forwards said replica of said selected data from said data structure to said second data replication facility at said second programmable electronic device in a synchronous manner.

41. The readable medium of claim 39, wherein said first programmable electronic device forwards said replica of said related data from said data structure to said second data replication facility of said second programmable electronic device in an asynchronous manner.

42. The readable medium of claim 33, wherein said communication protocol comprises the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

43. The readable medium of claim 33, wherein said first programmable electronic device and said second programmable electronic device operate without a volume manager facility.

44. The readable medium of claim 33, wherein said one or more areas of said first storage device comprise one of a track, a sector, a logical volume and a logical offset into said first storage medium.

45. A method for replicating data in a distributed network to update a remote storage device with data from a local storage device, said method comprising the steps of:

instructing a first data replication facility of a first electronic device in said distributed network to track one or more locations of a local storage device that correspond to one or more identified volumes;

grouping each of said one or more identified volumes into a group by said first data replication facility;

generating a replica of said group at said first data replication facility; and

asserting said replica in accordance with a communication protocol toward a second replication facility of a second electronic device in said distributed network to update said remote storage device.

46. The method of claim 45, further comprising the step of, sending a command from said first data replication facility to said second data replication facility of said second electronic device to initiate receipt of said replica.

47. The method of claim 45, further comprising the step of, packaging with said replica information that indicates a storage location for each volume in said replica for storage on said remote storage device.

48. The method of claim 45, further comprising the step of, sending from said second data replication facility to said first data replication facility an indication that said update to said remote storage device completed.

49. The method of claim 45, further comprising the step of, writing the replica to a local queue for temporary storage before said asserting of said replica in accordance with said communication protocol toward said second replication facility of said second computer occurs.

50. The method of claim 45, further comprising the step of, identifying to said first data replication facility of said first electronic device in said distributed network said one or more volumes of said data for said replicating of data to update said remote storage device.

51. The method of claim 47, wherein said information comprises one of a volume name and a volume number.